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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/695,906	10/30/2003	Akihiko Takeda	Q78005	5662

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SUGHRUE MION, PLLC  
2100 PENNSYLVANIA AVENUE, N.W.  
SUITE 800  
WASHINGTON, DC 20037

EXAMINER

HON, SOW FUN

ART UNIT PAPER NUMBER

1772

DATE MAILED: 12/21/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

10/695,906

Applicant(s)

TAKEDA ET AL.

Examiner

Art Unit

Sow-Fun Hon

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
  - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
  - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
  - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. ____   |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>10/30/03</u> .  | 6) <input type="checkbox"/> Other: ____                                     |

## DETAILED ACTION

### *Claim Objections*

1. Claim 18 is objected to because of the following informalities: the term "transfer material" is not commonly used to describe a multilayer photolithography structure which comprises a support, a resin layer, an interlayer and another resin layer.

### *Claim Rejections - 35 USC § 102*

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-5, 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Parusel et al. (US 5,625,021).

Regarding claims 1, 20, Parusel has a resin composition for a spacer (column 1, line 17), comprising at least one resin selected from: (1) a resin containing an allyl group (column 6, line 6) and (2) a resin containing at least an allyl group (monomer) (column 3, line 10) and a hydroxyl group (monomer) (column 2, lines 60-65).

Regarding claims 2-3, the resin comprises an allyl-containing methacrylate as a monomer unit (column 6, line 6).

Regarding claims 4-5, the resin comprises an allyl-containing methacrylate, and a benzyl methacrylate (column 6, lines 1-6) which is a methacrylate containing no allyl group.

*Claim Rejections - 35 USC § 103*

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 6-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Parusel.

Parusel has been discussed above.

Regarding claim 6, Parusel teaches that the resin contains an allyl-containing monomer as a crosslinking agent in the amount of 10 % by weight (column 5, lines 55-60), which meets the lower end of the claimed range. Therefore the claimed amount of more than 10 % by mole is the result of routine experimentation by one of ordinary skill in the art at the time the invention was made, in order to obtain the desired crosslinking.

Regarding claims 7-8, Parusel teaches that the resin contains hydrophilic monomers such as hydroxy (meth)acrylic acid or amino alkyl (meth)acrylate (ester of (meth)acrylic acid), to control the particle size in the direction of decreasing particle size (column 2, lines 60-68). Both the hydroxy and the amino functional groups are hydrophilic groups, and hence equivalent in function. Thus the claimed hydroxyalkyl (meth)acrylate, which is a hydroxy alkyl ester of (meth)acrylic acid, is the result of routine experimentation by one of ordinary skill in the art at the time the invention was made, in order to obtain the desired hydrophilicity, and hence particle size.

Regarding claims 9-10, Parusel teaches that the resin further comprises an allyl-containing methacrylate, and a benzyl methacrylate (column 6, lines 1-6) which is a methacrylate containing no allyl group.

Regarding claim 11, Parusel teaches that the resin contains hydrophilic monomers such as hydroxy (metha)crylic acid or amino alkyl methacrylate (ester of methacrylic acid), to control the particle size in the direction of decreasing particle size (column 2, lines 60-68). Both the hydroxy and the amino functional groups are hydrophilic groups, and hence equivalent in function. Thus the claimed hydroxyalkyl (meth)acrylate, which is a hydroxy alkyl ester of (meth)acrylic acid, is the result of routine experimentation by one of ordinary skill in the art at the time the invention was made, in order to obtain the desired hydrophilicity, and hence particle size. It follows that the claimed amount of 10 % by mole or more is the result of routine experimentation by one of ordinary skill in the art at the time the invention was made, in order to obtain the desired decrease in particle size.

Regarding claim 12, Parusel teaches that the resin contains an allyl-containing monomer as a crosslinking agent in the amount of 10 % by weight (column 5, lines 55-60). Therefore the claimed content of the resin containing an allyl group in the amount from 15 % to 70 % by mass of the total solid contents of the resin composition for the spacer, is the result of routine experimentation by one of ordinary skill in the art at the time the invention was made, in order to obtain the desired crosslinking.

Regarding claims 13-14, Parusel teaches a resin containing at least an allyl group (monomer) (column 3, line 10) and a hydroxyl group (monomer) (column 2, lines 60-65). The resin contains an allyl group (containing monomer) as a crosslinking agent in the amount of 10

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% by weight (column 5, lines 55-60), and a hydrophilic monomer such as hydroxy (meth)acrylic acid, to control the particle size in the direction of decreasing particle size (column 2, lines 60-68). Therefore the claimed content of resin containing an allyl group and a hydroxyl group, in the amount of from 15 % to 80 % (claim 13), and of from 15 % to 70 % (claim 14), by mass of the solid contents of the resin composition for the spacer, is the result of routine experimentation by one of ordinary skill in the art at the time the invention was made, in order to obtain the desired crosslinking and decrease in particle size.

6. Claims 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Parusel as applied to claims 1-5, 20 above, and further in view of Hashimoto et al. (US 5,955,198).

Parusel has been discussed above, and fails to teach that the resin composition for the spacer comprises an extender, also known as a filler, as defined by Applicant's specification (page 16, line 2).

Hashimoto teaches that the mechanical strength and hardness of a spacer is adjusted by the addition of an extender (filler) (column 4, lines 35-40).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have added an extender to the resin composition for the spacer of Parusel, in order to obtain mechanical strength and hardness, as taught by Hashimoto (claim 15).

It follows therefore, that the claimed content of the extender in the amount of from 5 % to 50 % by mass of the total solid contents of the resin composition for the spacer, is the result of routine experimentation by one of ordinary skill in the art at the time the invention was made, in order to obtain the desired mechanical strength and hardness, as taught by Hashimoto (claim 16).

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Hashimoto teaches the use of inorganic extenders (fillers) such as silica (column 4, lines 50-55), a commercially available example being aerosil 200 (column 6, lines 20-21).

Applicant's specification teaches #200 aerosil (page 16, 3<sup>rd</sup> paragraph). Thus the claimed filler average particle diameter of 0.01 to 0.5  $\mu\text{m}$  is inherently overlapped by the aerosil 200 taught by Hashimoto.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have added a commercially available extender taught by Hashimoto with an inherent average particle diameter of 0.01 to 0.5  $\mu\text{m}$ , to the resin composition for the spacer of Parusel, in order to obtain the desired mechanical strength and hardness, as taught by Hashimoto (claim 17).

7. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Parusel in view of Nakamura et al. (US 6,582,862) and Jain et al. (US 4,863,827).

Applicant's term "photoconductive transfer material" is being used by Applicant to define a multilayer photolithography structure as described in further detail by Applicant's specification (pages 21-33).

Parusel has been discussed above and teaches a resin composition for a spacer, which comprises (meth)acrylate monomers polymerized by radical polymerization (abstract). Parusel fails to teach that the spacers are formed using a temporary support, an alkali-soluble thermoplastic resin layer, an interlayer, and the photoconductive resin layer arranged in the same order as recited, part of the process of photolithography.

Nakamura teaches a resin composition for a spacer, and that a resin which comprises (meth)acrylate monomers, such as 2-hydroxyl ethylmethacrylate, which contain the radical

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polymerizable methacryloyl group, is photocurable (column 2, lines 60-70). Nakamura teaches the use of a photomask to form an exposure pattern (column 37, lines 65-70), ultraviolet ray irradiation to form the spacer pattern, and alkali-development to solubilize (remove) non-exposed (non-hardened) parts of the substrate) (column 38, lines 1-10), part of the process of photolithography.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have formed the spacers of Parusel from the (meth)acrylate resin composition of Parusel using the process of photolithography, as taught by Nakamura.

Parusel in view of Nakamura fails to teach that the resin composition for the spacer is used as the photoconductive resin layer in the multilayer photolithography structure of a temporary support, an alkali-soluble thermoplastic resin layer, an interlayer, and the photoconductive resin layer arranged in the same order as recited.

Jain teaches that in multilayer photolithography, a support (substrate) is covered by a photoresist layer and a different type of photoresist is placed on top of it (column 2, lines 28-35), with an interlayer (barrier layer) between the two photoresist layers (column 2, lines 40-50). Jain teaches that the first photoresist layer is an alkali soluble resin layer (abstract) and that the second photoresist layer on top is a photoconductive (light sensitive) resin layer (abstract). The first photoresist resin layer is thermoplastic in that it is a polyvinyl phenol resin (column 4, lines 65-70) and dissolves in a solvent (column 5, lines 8-10).

Jain teaches that multilayer photolithography improves resolution (column 2, lines 25-30). Therefore it would have been obvious to one of ordinary skills in the art at the time the invention was made, to have used the claimed process of multilayer photolithography, as taught



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by Jain, to form the spacers of Parusel in view of Nakamura, in order to obtain improved resolution of spacer pattern, as taught by Jain.

8. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Parusel in view of Hashimoto, as applied to claims 15-17 above, and further in view of Jones (US 5,529,524).

Parusel in view of Hashimoto has been discussed above. Parusel teaches that the spacers formed from the claimed composition are used in displays (column 1, line 17). Hashimoto teaches that the spacers are used in liquid crystal displays (column 1, lines 5-10), formed on a substrate (base plate) (column 3, lines 14-20).

Parusel in view of Hashimoto fails to teach that the spacers are pixel-patterned.


Jones teaches that a pixel-patterned spacer (part of the pixel-pattern) is unobtrusive to the viewer of the display (column 15, lines 25-30).

Therefore it would have been obvious to one of ordinary skill in the art to have formed the spacers of Parusel in view of Hashimoto, into pixel-patterned spacers, as taught by Jones, on a substrate for a liquid crystal display, as taught by Hashimoto, in order to obtain a liquid crystal display where the spacers are unobtrusive to the viewer of the display, as taught by Jones.

9. Claim 20 has been discussed above.

10. Claims 21-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Parusel as applied to claims 1-5, 20 above, and further in view of Nakamura and Jones.

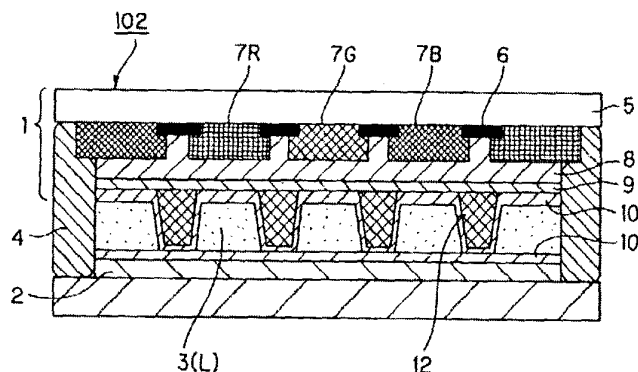
Parusel teaches a spacer in a display (column 1, line 17), comprising at least one resin selected from: (1) a resin containing an allyl group (column 6, line 6) and (2) a resin containing at least an allyl group (monomer) (column 3, line 10) and a hydroxyl group (monomer) (column 2, lines 60-65).



Parusel fails to specify that the display is a liquid crystal display device with the corresponding liquid crystal cell structure.

Nakamura teaches a liquid crystal display device in Fig. 2 below, comprising a pair of substrates facing each other (electrode substrates 2, 9), a spacer (12) disposed between the pair of substrates for maintaining a cell gap (3) between the pair of substrates constant; and a liquid crystal (L) sealed into a space (gap part 3) defined by the pair of substrates and the spacer (12) (column 1, lines 45-60 and column 2, lines 20-30).

FIG. 2



Nakamura teaches that the spacer is formed by a resin composition (column 32, lines 10-15), which comprises a resin containing acrylic acid and 2-hydroxyl ethyl methacrylate (column 32, lines 20-25).

Parusel teaches that the resin composition for forming the spacer, contains hydrophilic monomers such as hydroxy (meth)acrylic acid) or amino alkyl methacrylate (ester of (meth)acrylic acid), to control the particle size in the direction of decreasing particle size (column 2, lines 60-68), allowing the spacer dimensions to be decreased to the desired level.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have used the spacer composition of Parusel to form the spacer in the

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liquid crystal display of Nakamura, in order to obtain a liquid crystal display spacer with the desired control of spacer size.

Parusel in view of Nakamura fails to teach that the spacer is pixel-patterned.

Jones teaches that a pixel-patterned spacer (part of the pixel-pattern) is unobtrusive to the viewer of the display (column 15, lines 25-30).

Therefore it would have been obvious to one of ordinary skill in the art to have formed the spacers of Parusel in view of Nakamura, into pixel-patterned spacers, as taught by Jones, on a substrate for a liquid crystal display, as taught by Nakamura, in order to obtain a liquid crystal display wherein the spacers are unobtrusive to the viewer of the display, as taught by Jones (claim 21).

Parusel teaches that the spacers are stable in shape ('021, column 1, lines 5-10). Nakamura teaches that the spacers have excellent dimensional stability in order to keep the cell gap of the liquid crystal display ('862, column 32, lines 10-15) constant. Jones teaches that the spacers aid in the alignment of the display's substrates (plates) and the maintenance of good long-term vacuum in the interior volume of the panel ('524, column 15, lines 30-35), which means that the spacers must have good dimensional stability. Therefore the claimed plastic deformation of 0.3  $\mu\text{m}$  or less, as determined in a compression test at a load speed of 0.145 gf/sec, a load of 2 gf, a retention time of 5 sec, and a measurement temperature of 160 °C using a cylindrical penetrator having a diameter of 50  $\mu\text{m}$ , is either inherent in the spacer of Parusel in view of Nakamura and Jones, or the result of routine experimentation by one of ordinary skill in the art at the time the invention was made, in order to obtain a stable liquid crystal display device with the desired dimensional stability of the liquid crystal cell gap (claim 22).

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Any inquiry concerning this communication should be directed to Sow-Fun Hon whose telephone number (571)272-1492. The examiner can normally be reached Monday to Friday from 10:00 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Harold Pyon, can be reached on (571)272-1498. The fax phone number for the organization where this application or proceeding is assigned is (703)872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

S. Hon.

Sow-Fun Hon

12/07/04